

CLAIMS

1. A heat dissipation type semiconductor package including a die paddle, a semiconductor chip mounted on the die paddle, and a lead frame, comprising:
 - 5 a plurality of wires electrically connecting bond pads formed on the semiconductor chip and inner leads in the lead frame;
a heat-radiating canopy attached to a top surface of the semiconductor chip; and
molding material surrounding all of the die paddle, the semiconductor chip, the inner leads and a bottom surface of the heat-radiating canopy;
10 wherein the top surface of the heat-radiating canopy is exposed to the exterior, and a portion of the surface of the heat-radiating canopy being in contact with the semiconductor chip is recessed.
2. The heat dissipation type semiconductor package according to claim 1, wherein the
15 heat-radiating canopy is attached to an active area of the top surface of the semiconductor chip.
3. The heat dissipation type semiconductor package according to claim 2, wherein the
heat-radiating canopy has a round shape or a polygonal shape depending on the shape of
20 the semiconductor package.
4. The heat dissipation type semiconductor package according to claim 1, wherein the
heat-radiating canopy is made of a material selected from a group consisting of thermal
conductive materials, electrically conductive materials and an arbitrary combination
25 thereof.
5. The heat dissipation type semiconductor package according to claim 1, wherein an
edge of the heat-radiating canopy is curved toward a bottom surface of the semiconductor
package.

6. The heat dissipation type semiconductor package according to claim 1, wherein an edge of the heat-radiating canopy is formed with a portion protruding toward a bottom surface of the semiconductor package.
- 5 7. The heat dissipation type semiconductor package according to claim 1, further comprising an external heat slug attached to the exposed top surface of the heat-radiating canopy.
8. The heat dissipation type semiconductor package according to claim 1, wherein the
10 exposed top surface of the heat-radiating canopy is formed with a plurality of projections thereon.
9. The heat dissipation type semiconductor package according to claim 1, wherein the
15 heat-radiating canopy is plated.
10. A heat dissipation type semiconductor package including a substrate, a die paddle formed on the substrate, a semiconductor chip mounted on the die paddle, and inner leads attached to the substrate and serving as electrical contacts, comprising:
a plurality of wires electrically connecting bond pads formed on the semiconductor
20 chip and the inner leads;
a heat-radiating canopy attached to a top surface of the semiconductor chip;
a molding material surrounding all of the die paddle, the semiconductor chip, the inner lead and a bottom surface of the heat-radiating canopy; and
solder balls mounted on a bottom surface of the substrate and serving as electrical
25 inputs/outputs;
wherein the top surface of the heat-radiating canopy is exposed to the exterior, and a portion of the surface of the heat-radiating canopy being in contact with the semiconductor chip is recessed.
- 30 11. The heat dissipation type semiconductor package according to claim 10, wherein

the heat-radiating canopy is attached to an active area in the top surface of the semiconductor chip.

12. The heat dissipation type semiconductor package according to claim 11, wherein
5 the heat-radiating canopy has a round shape or a polygonal shape depending on the shape of the semiconductor package.

13. The heat dissipation type semiconductor package according to claim 10, wherein
10 the heat-radiating canopy is made of a material selected from a group consisting of thermal conductive materials, electrically conductive materials and an arbitrary combination thereof.

14. The heat dissipation type semiconductor package according to claim 10, wherein
15 an edge of the heat-radiating canopy is curved toward a bottom surface of the semiconductor package.

15. The heat dissipation type semiconductor package according to claim 10, wherein
an edge of the heat-radiating canopy is formed with a portion protruding toward a bottom
surface of the semiconductor package.

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16. The heat dissipation type semiconductor package according to claim 10, further
comprising an external heat slug attached to the exposed top surface of the heat-radiating
canopy.

25 17. The heat dissipation type semiconductor package according to claim 10, wherein
the exposed top surface of the heat-radiating canopy is formed with a plurality of
projections thereon.

18. The heat dissipation type semiconductor package according claim 10, wherein the
30 heat-radiating canopy is plated.

19. A method of fabricating a heat dissipation type semiconductor package, comprising the steps of:

5 attaching a semiconductor chip to a die paddle of a lead frame of a semiconductor package;

connecting bond pads on the semiconductor chip and inner leads in the lead frame by means of wires;

attaching a heat-radiating canopy to a top surface of the semiconductor chip;

10 performing a molding in such a manner that a top surface of the heat-radiating canopy is exposed to the exterior; and

trimming and forming out leads in the semiconductor package obtained after completion of the molding so as to form I/O terminals of the semiconductor package.

20. The method according to claim 19, wherein the semiconductor chip attaching step
15 comprises the step of attaching the semiconductor chip by means of an adhesive and then curing the adhesive using an electric oven or a heater block.

21. The method according to claim 19, wherein the wires are made of any one of gold, copper, aluminum, and an arbitrary combination thereof.

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22. The method according to claim 19, wherein a central portion of the heat-radiating canopy is recessed so that a portion of the heat-radiating canopy, which is located above the top surface of the semiconductor chip, is in contact with the semiconductor chip and the remaining portions of the heat-radiating canopy are not in contact with the semiconductor
25 chip.

23. The method according to claim 22, wherein, when the heat-radiating canopy is attached to the top surface of the semiconductor chip, the heat-radiating canopy is caused to be in contact with an active area of the semiconductor chip.

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24. The method according to claim 22, wherein the heat-radiating canopy is made of a material selected from a group consisting of thermal conductive materials, electrically conductive materials and an arbitrary combination thereof.
- 5 25. The method according to claim 19, wherein the heat-radiating canopy has a round shape or a polygonal shape depending on the shape of the semiconductor package.
26. The method according to claim 19, wherein an edge of the heat-radiating canopy is curved toward a bottom surface of the semiconductor package.
- 10 27. The method according to claim 19, wherein an edge of the heat-radiating canopy is formed with a portion protruding toward a bottom surface of the semiconductor package.
28. The method according to claim 19, wherein the heat-radiating canopy attaching
15 step comprises a step of attaching the heat-radiating canopy to the top surface of the semiconductor chip by means of an adhesive and then curing the adhesive using an electric oven or a heater block.
29. The method according to claim 28, wherein the adhesive is selected from a group
20 consisting of thermo-plastic adhesive epoxy, thermo-set adhesive epoxy, thermal conductive epoxy, electrically conductive epoxy, an adhesive tape, and an arbitrary combination thereof.
30. The method according to claim 19, further comprising a step of forming a plurality
25 of projections on the exposed surface of the heat-radiating canopy.
31. The method according to claim 19, further comprising a step of attaching an external heat slug to the exposed surface of the heat-radiating canopy.
- 30 32. The method according to claim 19, further comprising a step of performing a post-

mold curing process using an electric oven, after the molding step.

33. The method according to claim 19, further comprising a step of polishing or defleshing the exposed surface of the heat-radiating canopy.

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34. The method according to claim 19, further comprising a step of plating the out leads or the exposed surface of the heat-radiating canopy.

35. A method of fabricating a heat dissipation type semiconductor package,
10 comprising the steps of:

forming a die paddle and inner leads on a substrate;

attaching a semiconductor chip to the die paddle;

connecting bond pads on the semiconductor chip and the inner leads by means of
wires;

15 attaching a heat-radiating canopy to a top surface of the semiconductor chip by
means of an adhesive;

performing a molding in such a manner that a top surface of the heat-radiating
canopy is exposed to the exterior; and

20 forming solder balls on a bottom surface of the semiconductor package after
completion of the molding step.

36. The method according to claim 35, wherein the semiconductor chip attaching step
comprises a step of attaching the semiconductor chip by means of an adhesive and then
curing the adhesive using an electric oven or a heater block.

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37. The method according to claim 35, wherein the wires are made of any one of gold,
copper, aluminum, and an arbitrary combination thereof.

38. The method according to claim 35, wherein a central portion of the heat-radiating
30 canopy is recessed so that a portion of the heat-radiating canopy, which is located above

the top surface of the semiconductor chip, is in contact with the semiconductor chip and the remaining portions of the heat-radiating canopy are not in contact with the semiconductor chip.

5 39. The method according to claim 38, wherein, when the heat-radiating canopy is attached to the top surface of the semiconductor chip, the heat-radiating canopy is caused to be in contact with an active area of the semiconductor chip.

40. The method according to claim 35, wherein the heat-radiating canopy is made of a
10 material selected from a group consisting of thermal conductive materials, electrically conductive materials and an arbitrary combination thereof.

41. The method according to claim 35, wherein the heat-radiating canopy has a round shape or a polygonal shape depending on the shape of the semiconductor package.

15 42. The method according to claim 35, wherein an edge of the heat-radiating canopy is curved toward a bottom surface of the semiconductor package.

43. The method according to claim 35, wherein an edge of the heat-radiating canopy is
20 formed with a portion protruding toward a bottom surface of the semiconductor package.

44. The method according to claim 35, wherein the heat-radiating canopy attaching step comprises a step of attaching the heat-radiating canopy to the top surface of the semiconductor chip by means of an adhesive and then curing the adhesive using an electric
25 oven or a heater block.

45. The method according to claim 44, wherein the adhesive is selected from a group consisting of thermo-plastic adhesive epoxy, thermo-set adhesive epoxy, thermal conductive epoxy, electrically conductive epoxy, an adhesive tape, and an arbitrary
30 combination thereof.

46. The method according to claim 35, further comprising a step of attaching an external heat slug to the exposed surface of the heat-radiating canopy.

5 47. The method according to claim 35, further comprising a step of performing a post-mold curing process using an electric oven, after the molding step.

48. The method according to claim 35, further comprising a step of polishing or defleshing the exposed surface of the heat-radiating canopy.

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49. The method according to claim 35, further comprising a step of plating the out leads or the exposed surface of the heat-radiating canopy.

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50. The method according to claim 35, further comprising a step of forming a plurality of projections on the exposed surface of the heat-radiating canopy.